

parts of the valve, number of slits, &c., even in closely allied forms; thus care must be taken not to lay too great stress on any one series of characters.

The shell is more or less imbedded in and entirely surrounded by the girdle or zona, the upper surface of which is variously covered with scales, spines, bristles, hair, or down. The nature of the girdle forms a valuable auxiliary for systematic purposes, as the character of the covering is usually very constant in the different groups. In certain genera, groups or even large tufts of spines or bristles are placed in pairs near the sutures between the valves, and there are usually two on each side round the anterior valve, making a total of nine pairs of tufts; the tufts arise from depressions in the surface of the girdle, which are termed pores: in *Acanthochiton*, for example, these pores are often very deep pits. The terms which are employed to indicate the different kinds of girdle armature merely have reference to their appearance, and have no morphological significance; all of them have a chitinous matrix, which is more or less completely infiltrated by calcareous salts. The under surface of the girdle is characterised by possessing delicate elongated flat scales.

Another character which is worthy of notice is the number and extent of the gills; these are fewest in number in the Leptoidea, and reach their maximum development in the Lophyroidea, Acanthoidea, and in the higher Ischnoidea.

Professor Moseley has suggested the utilisation of the arrangement of the megalopores and micropores of the shell for classificatory purposes. My researches on the structure of the shells are not at present sufficiently complete to enable me to test the accepted divisions of the group by this means. The histological structure of the tegmentum and the distribution of the dermal processes (megalæsthetes and micræsthetes of Moseley) will, however, prove of the greatest value and interest.

I must take this opportunity of acknowledging my great indebtedness to my friends Mr W. H. Dall, of the Smithsonian Institution, Washington, and to Mr E. A. Smith, of the British Museum, who have at all times given me the benefit of their experience. To the former I am further indebted for being permitted to examine Dr Carpenter's MS., which Mr Dall has in his possession, and for the gift of several rare species of Chitons.

The collection of Chitons was first forwarded to the Rev. R. Boog Watson, who had named a few of them, and to whom I am indebted for some valuable clues.

I have taken the following table from Dall's paper On the Genera of Chitons, to serve as a key to the genera mentioned in this report, without however committing myself to its entire acceptance, as it is better to leave the table as it stands than to make alterations which would only be partial and incomplete. In the case of the Leptoidea only have I given a synopsis of the genera of the group. Its introduction serves to elucidate the concluding remarks concerning the probable line of differentiation within the order.